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DESIGN OF A WEBSITE-BASED CHURCH INFORMATION SYSTEM USING THE AGILE METHOD (OBJECT: HKBP PERUMNAS BATU ONOM)

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Abstract

HKBP Perumnas Batu Onom is a Christian place of worship located on Tusam Raya Street, Perumnas-Batu Onom, Pantoan Maju, Siantar District, Simalungun Regency, North Sumatra. The HKBP Perumnas Batu Onom Church has been established since March 13, 1983, and has conducted numerous service activities and visits. However, the service application mechanism is still done directly at the church, which is considered less effective. Based on this issue, a solution was found by shifting the information dissemination and service mechanism to an online medium using a website. The Agile methodology was employed in designing the website, following the stages of the agile method, with data collected through observation and interviews. It was determined that integrating information dissemination and services into a website-based system provides a solution to the problem. The HKBP Perumnas Batu Onom website was successfully created using the PHP programming language and the Laravel framework. To ensure optimal results, Blackbox Testing was conducted with the congregation and church management of HKBP Perumnas Batu Onom. It was found that the HKBP Perumnas Batu Onom information website facilitates the congregation in obtaining information about worship schedules and church activities, and assists church management in managing congregation data and financial reporting.

Keywords : church; website; agile; PHP; black box testing

INTRODUCTION

The church is a spiritual institution for Christians that is based on divine concepts [1]. In the church there are various various types of service activities, especially worship activities , such as Sunday Service, Youth Service, Women's Service, Sunday School Service, and other services. In addition to worship activities , the church also offers various types of service activities, such as catechism services, baptism services, marriage blessing services, and social activities. The Huria Kristen Batak Protestant Church, especially in the Batu Onom Housing area, which has been established for a long time, certainly has a high flow of data and information traffic. Based on the research, [2]there are similar problems: Microsoft Word is still used as a medium for sharing information for the past week and Microsoft Excel is used for data management. This makes it less than optimal for the congregation to obtain information from the church. For example, church data is still printed on paper, where the papers are stored in a storage cabinet. When officers need data to be searched or information related to church or congregation news, they open the storage cabinet and search for the data they are looking for. So, it takes officers two hours to find a piece of data. Over time, these papers can be damaged by termites or age. Currently, the development of information technology is undergoing significant changes. rapidly. Congregational ministry is an activity within a church carried out by the pastor, the congregation, and church members. Congregational ministry is not limited to the church grounds but also occurs outside the church, in the form of community service activities or other activities. The church is an organization that is involved in congregational ministry. The church has an information management system, including data management, storage, and presentation. Members of a church organization are considered a congregation, namely a group of believers who worship God. Therefore, within the church there is congregational organizational data obtained from the results of church activities, which includes data on baptisms, marriages, worship, births, deaths and congregation status. And also most churches still process data

- data that is considered important, and based on research, [3]the storage system, delivery and management of data still uses paper as a print medium stored as an archive in the file folder, and Microsoft Excel to input congregation data so there is the possibility of errors and also lost files. The HKBP Perumnas Batu Onom Church also provides services for its congregation, such as baptisms, weddings, baptisms, births, illnesses, relocations, and deaths. To register and receive these services, congregations must contact the church administrators in their respective neighborhoods, fill out a registration form on paper, and then bring it to the church secretary. Over time, this procedure has become less effective due to the possibility that the church administrators may not be present or at home. This problem has forced the congregation to wait for the administrators to arrive home. After waiting for the administrators, the congregation must wait for the registration forms to be processed by the church secretary. Because the registration process may not be completed immediately and must wait until tomorrow, this procedure is considered less effective.

As technology advances, researchers are considering the issue of service information. Because the delivery of worship services, church news, and congregational data processing still relies on paper, research findings [4]suggest that information systems can help elders and church administrators process data and provide information to congregations more easily, effectively, and efficiently. In the study [5], the results showed that the use of information systems as a medium for disseminating information and managing data was considered effective and helped the elders in managing data, and the congregation felt helped in obtaining information. Based on this research, the author chose to use a website as a tool for processing, storing, and disseminating church information because the website allows various ways to display information. In addition, by considering the roles given to the congregation and administrators, the website can help limit congregation access and provide administrators with unique capabilities to manage congregation information and data. The author built a church information website based on the above problems and used agile methods as a reference for website development. Agile is a software development technique that focuses on flexibility, adaptability, and team collaboration. The author can achieve better goals by using Agile principles such as responsiveness to change, effective team collaboration, and a focus on quality.

RESEARCH METHOD

The data collection method in this study uses observation, interview and literature study techniques.

2.1 Observation

Observational data collection was conducted by directly observing the location of the research object, namely the HKBP Perumnas Batu Onom Church located on Jalan Tusam Raya Perumnas-Batu Onom, Pantoan Maju, Siantar District, Simalungun Regency, North Sumatra. This observation activity was carried out by observing how the worship process was taking place, how the process of disseminating and conveying church information, how information about church activities was conveyed, how the activity registration process and form filling system were carried out, and how congregation data and weekly reports were managed at the HKBP Perumnas Batu Onom Church.

2.2 Interview

Data collection through interviews was conducted at the HKBP Perumnas Batu Onom church and was conducted with stakeholders, namely the management of the HKBP Perumnas Batu Onom church on Jalan Tusam Raya Perumnas-Batu Onom, Pantoan Maju, Siantar District, Simalungun Regency, North Sumatra.

2.3 Literature Study

A previous literature review supports this research. First, a study by [6][[The Scrum Model for Designing a Mobile-Based Church Information System at the Toraja Church, Tarondon Congregation]] found that the use of information system technology to manage and display news was considered effective, and the Tarondon congregation felt they could easily access information about church activities and other matters. Second, the study entitled Designing a Web-Based Student Care Group Attendance System Using the Agile Development Method (Case Study: Universitas Advent Indonesia) found [7]that the application of agile methods to the attendance system website helped solve the problem of the attendance process at Universitas Advent Indonesia, which was still carried out manually according to the agile method stages. In addition, by considering the following factors, the study found that

Third, a study entitled "Website-Based Information System at St. Pius X Church Gisting" found [8]that the website's offerings make it easier for congregants to obtain information about church activities. Evaluated, features such as service schedules, announcements, and church devotions can help congregants manage information and make it accessible. The software development method for creating applications in this research is the agile method which has the following stages:

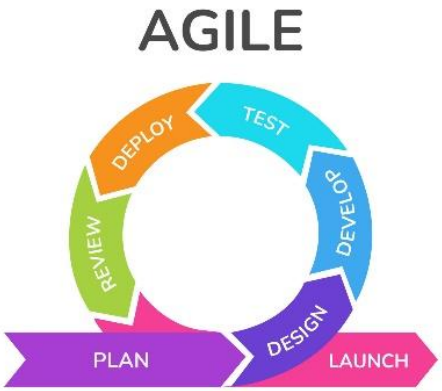

Figure 0. 0. 1Agile Method

a. Plan

The purpose of this stage is to gain an understanding of how the information required by users is sent to the system. Drawing conclusions based on the information gathered from the source (HKBP Perumnas Batu Onom Church), so that a complete and thorough plan can be made to meet the needs of the users of the system to be built. At this stage, the problem will be examined from the perspective of the congregation and church officials. The problem can be further investigated by first considering basic aspects, such as the perspective of humans, machines, methods, materials, measurements, and the environment. After conducting a thorough analysis of the problem using a fishbone diagram, the research can then move on to examining the functional and non-functional requirements of the proposed solution. This includes evaluating the security level of the system itself and integrating church information from paper to the website.

b. Design

The design phase is conducted based on the data obtained and will provide a clear picture of what needs to be done. This design phase focuses on the website's usability and user comfort. This design phase will consist of two stages: low-fidelity and high-fidelity.

c. Development

At this stage, the author translates the system design and analysis into a computer-readable programming language using programming code. The resulting code will produce an information system that meets the design requirements and functions properly.

d. Testing

After successful system development, the next step is verification, which involves examining and testing the entire system to identify any errors or failures. Distributing the system to several congregations can be helpful in this phase, as the congregation and HKBP Perumnas Batu Onom church administrators can assess whether their system is functioning correctly.

e. Deployment

The goal of this step is to distribute the application created by the developer so that the congregation can access the website online.

f. Review

User response testing of the application is the final stage in the agile development idea, which is based on a specified timeframe.

ESULTS AND DISCUSSION

Until now, the church has only disseminated news through paper media, accessible only before and after services, which is a business process. The following is a picture of the current business process at HKBP Perumnas Batu Onom:

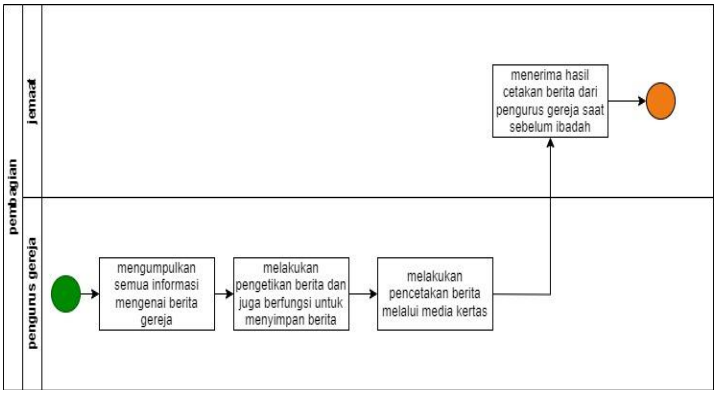

Figure 1business process in progress

The business processes that run in the news dissemination cycle of the HKBP Perumnas Batu Onom church are as follows:
The HKBP Perumnas Batu Onom Church typically holds a meeting to discuss the church's development and future activities. These meetings, known as "Sermons," are held every Friday. After the sermon, the church board discusses the church's activities for the coming week. The results of these discussions are typed, printed, distributed, and archived. After completing the news typing, the file will be printed on paper and distributed to the congregation, usually placed in front of the church entrance for the congregation to take. In addition to being distributed on paper at the church door, church news will also be read during the service. The implementation of agile stages is the reference in creating the HKBP Perumnas Batu Onom church information system website, namely:

3.1 Plan

During the planning stage, several needs analyses were conducted to obtain satisfactory information from both church administrators and the congregation. These analyses included:

Functional Requirements Analysis

Table 1functional requirements analysis

Actor	Functional Requirements
Congregation	Requires a system that displays information regarding worship activity schedules, requires a system that displays news related to activities outside of worship carried out by HKBP Perumnas Batu Onom, requires a system that displays worship news in the form of an e-book and can be viewed online or downloaded, and requires a service registration system so that services can be enjoyed quickly and efficiently.
Secretary	Requires a system that can accommodate all data inputted by users, requires a system that functions to manage congregation data and financial news as reporting. requires a system that can display information related to worship schedules and activities carried out by HKBP Perumnas Batu Onom, requires a system to manage all information that will be conveyed to the congregation, requires a system that functions to filter data based on the date of birth of the congregation in one week, requires a system that functions to display congregation input data based on the creation of data collection within a period of one week, requires a system that functions as a place to store all documentation of ongoing activities.

Non-Functional Requirements Analysis

Non-functional requirements analysis is more directed at how and what experience the actor will experience while using the application. Some of the needs that fall into non-functional requirements are; Fast response time from the website to ensure an extraordinary user experience, a high level of security to protect sensitive information on the web if necessary, handling spikes in user traffic without reducing performance or system failure. compatibility and attractive appearance, responsive to desktops, tablets, and mobile phones.

3.2 Design

In the design stage, it will display several UML and design views of several pages with their functions.

Usecase Diagram

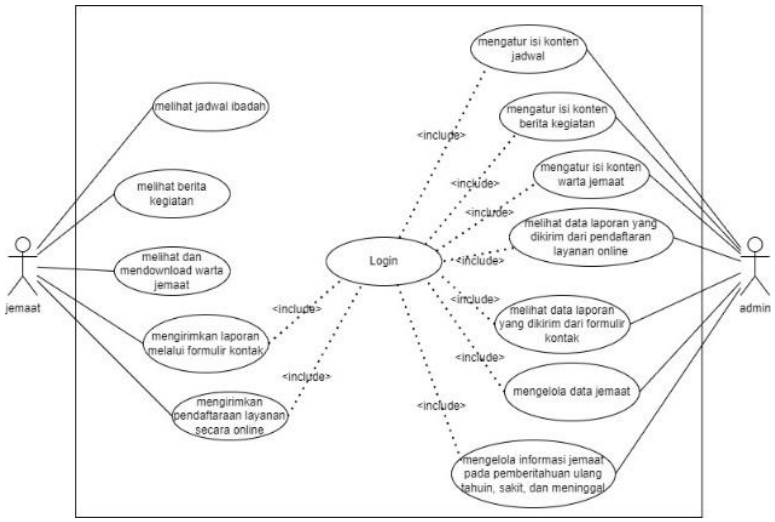

Figure 2usecase diagram

Use case diagrams are used to visualize what an actor can do. Figure 3.2 shows two actors: the congregation and the church administrator. The congregation has two types of access: login and non-input (guest) login. The administrator is required to log in to be recognized as an admin.

Activity Diagram

An activity diagram for creating an account, where any user who doesn't already have an account can create one on this page before entering the login page. The login page requires each user to log in first to use all the features provided on the HKBP Perumnas Batu Onom website. This page also identifies the account based on the role entered.

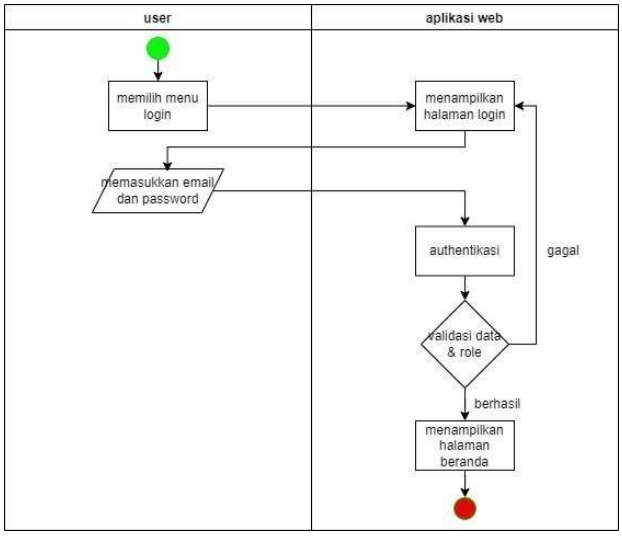

Figure 3activity diagram login

After logging in, users can access the service page where the congregation can send the data required by the admin for registration on the service, the service page has several types of services so that the congregation can choose the service according to the congregation's needs.

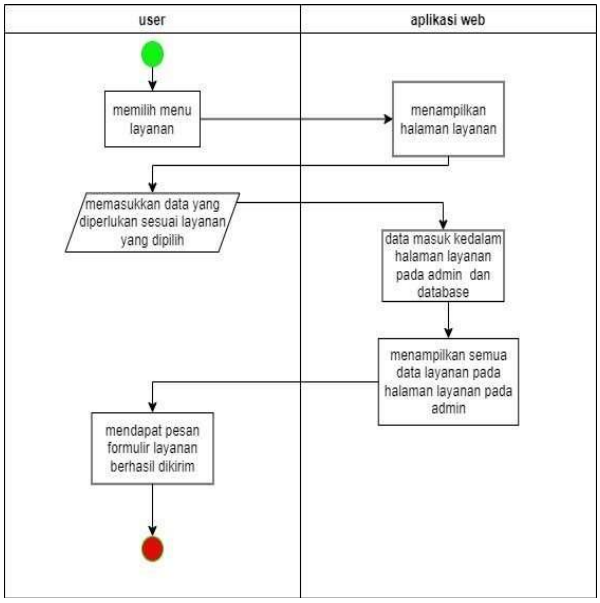

Figure 4service activity diagram

Admins can manage the content on the HKBP Perumnas Batu Onom website in the schedule section, admins have access to create, edit, and delete worship schedules.

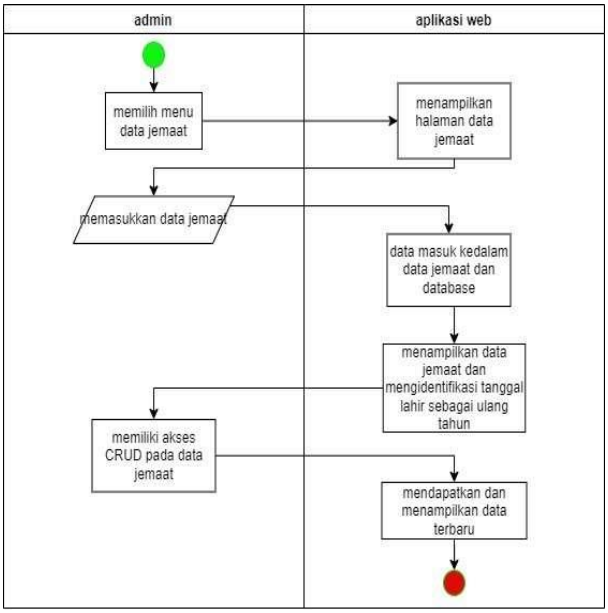

Figure 5activity diagram admin congregation data

Class Diagram

Class diagrams function to identify several classes and relationships in a system based on the attributes of each class and the methods that can be performed by the class.

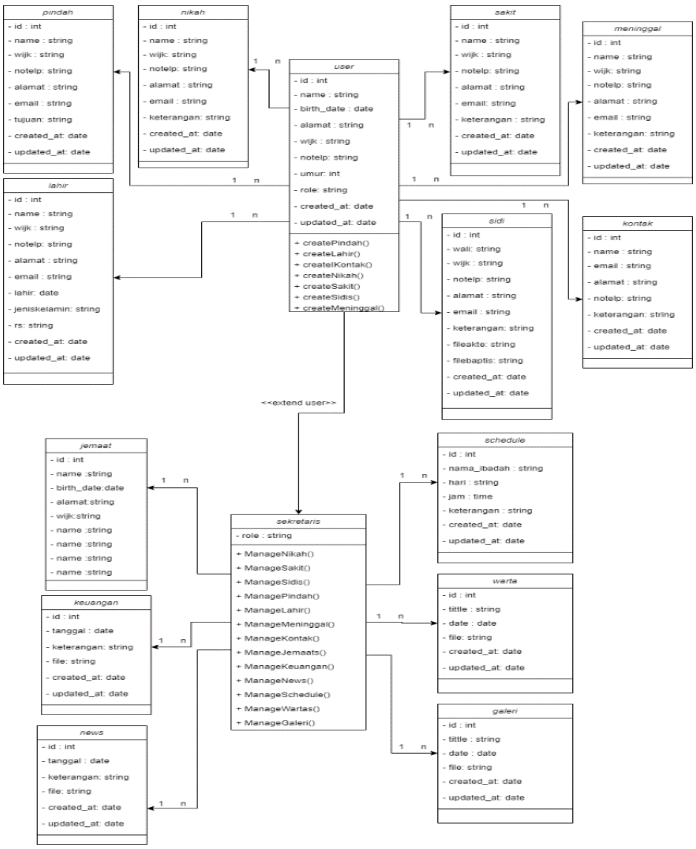

Figure 6class diagram

In accordance with the understanding and function of the use case diagram, it can be seen that there are 2 actors who operate the church information system website:

User: To obtain a user role, users must complete the account registration and login process. Once completed, users can access the webpage, where they can submit complaints and suggestions by filling out the contact form on the about page. Congregants can also easily and independently register on the services page, which offers registration features such as new registration, sidi registration, marriage registration, and information about deaths, illnesses, births, and transfers.

Secretary: The secretary's job is to manage all the website's features and pages. After logging in, the secretary can open the website and view all pages to check for any issues. The secretary can also perform CRUD on church news, service bulletins, service schedules, and the gallery. They can also receive, handle, and delete congregation complaints on the contact form. They can also add, delete, and edit congregation data based on their birth dates. The secretary can also see which congregation members are celebrating birthdays within the next week. Additionally, the secretary can monitor financial reports, which can be saved or downloaded to the secretary's financial news page.

Sequence Diagram

Sequence diagrams are used to show how objects communicate with each other to achieve a specific goal, such as sending and receiving messages.

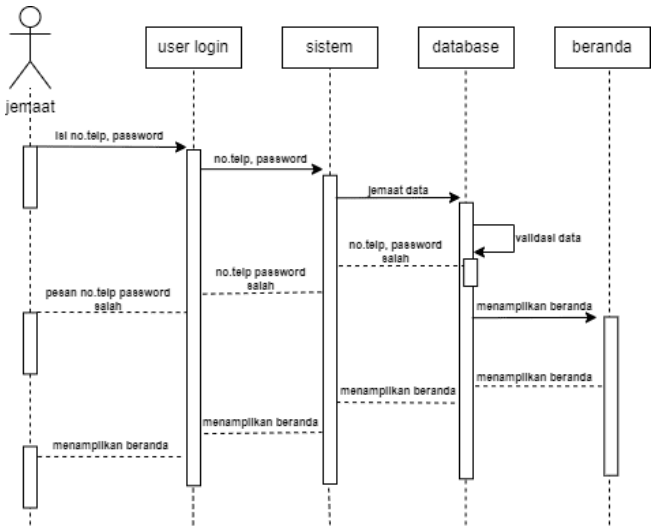

Figure 7login sequence diagram

For example, Figure 7 shows how the system works when a feature is used. Here, if a member wants to log in to the website, the system displays a login page containing the information needed to recognize the user, such as a phone number and password. The member must enter their registered phone number and password, and the system sends it to the database to match the received data with the stored data. If the data is deemed valid, the system displays the home page. If the data is invalid, the system returns to the login page with an error message, such as an unregistered phone number or an incorrect password.

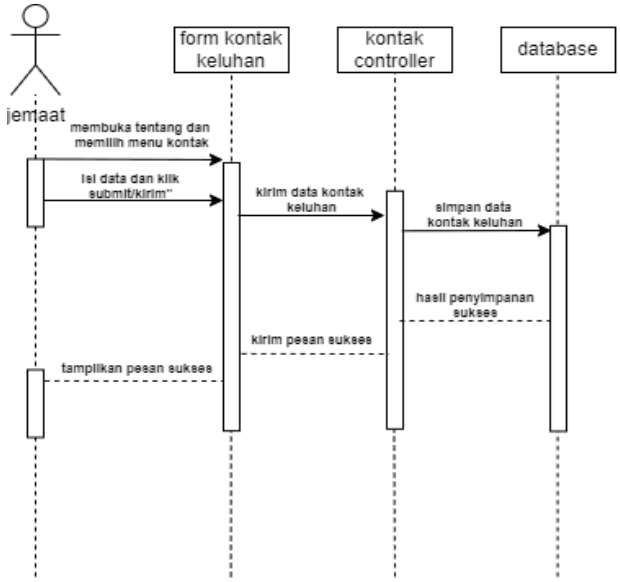

Figure 8sequence diagram of complaint contact

Mock Up

At this stage, a low-fidelity wireframe design was designed using the Figma application tool for the HKBP Perumnas Batu Onom church website system by paying attention to several golden rules guidelines for creating UI/UX designs.

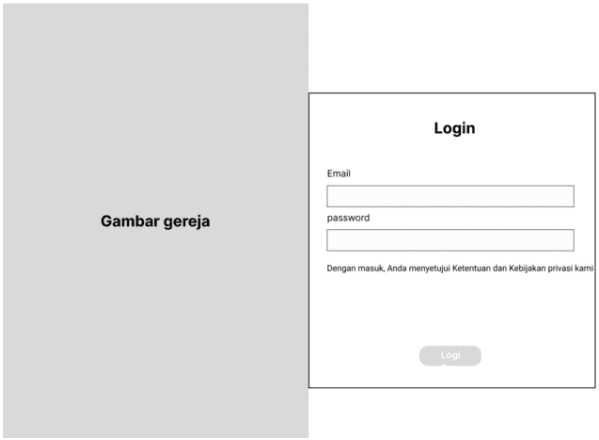

Figure 9login page

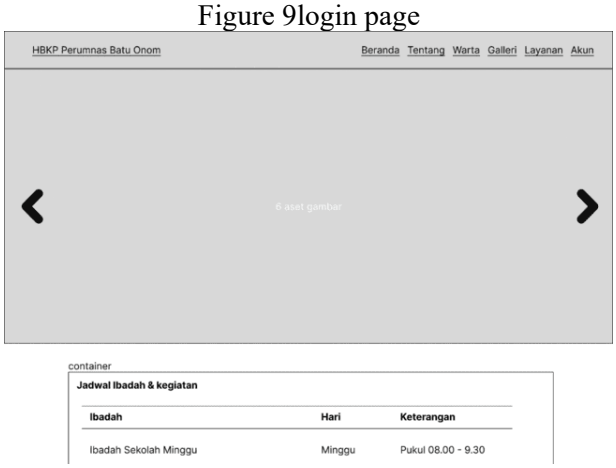

Figure 10home page

Figure 11pages about the church

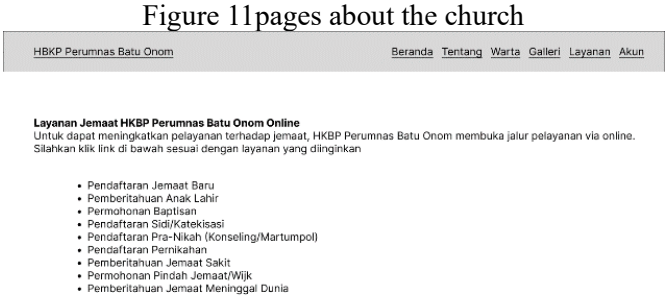

Figure 12service page

3.3 Develop

The Development phase is the website creation phase based on all the UI designs created during the design phase. This phase involves using PHP as the primary programming language, with the assistance of the

Bootstrap and Laravel frameworks. This phase focuses on the development of required features and functions, based on information from the plan and design.

Figure 13user authentication

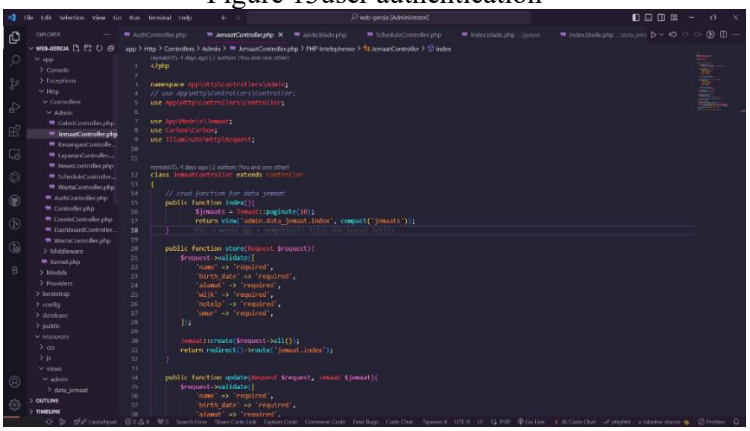

Figure 14congregation controller

Figure 15controller dashboard

3.4 Testing

At this stage, testing is carried out using blackbox testing. The test results are as follows:

Table 2black box testing

No.	Menu or function	User	Stages	Expected results	Results	
					In accordance	It is not in accordance with
1.	Create Account	All actors	1. Enter name 2. Enter phone number 3. Enter Address 4. Enter email 5. Enter password	Successfully created account	Yes	

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			6. Press create account			
2.	Login	All actors	1. Enter your registered email and password 2. Press Login	Successfully logged in using the account without any problems	yes	
3.	Send complaint contact	Congregation	1. Press the about menu on the navbar 2. Press the button here.. on the contact 3. Fill out the contact form and subject 4. Press the send button	Successfully submit complaints and feedback to the church admin	yes	
4.	Submitting the service form	congregation	1. Press the service menu on the navbar 2. Press the button here.. according to the desired service 3. Fill out the service form according to the desired service 4. Press the send button	Successfully submit the registration form to the online service	yes	
5.	Manage worship schedule content	Admin	1. Press the worship schedule menu 2. Press the button to add a prayer schedule 3. fill in the required data on the worship schedule 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	Successfully added a worship schedule, edited a worship schedule, and deleted a worship schedule and displayed it on the home page.	yes	
6.	Managing activity news content	admin	1. Press the activity news menu 2. Press the add news button 3. fill in the required data in the activity report 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	Successfully added activity news, edited activity news, and deleted activity news and displayed it on the homepage and news.	Yes	
7.	Managing worship news content	admin	1. Press the worship news menu 2. Press the add news button	Successfully added worship news, edited worship news,	Yes	

			3. Fill in the required data in the worship report 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	and deleted worship news and displayed it on the news page.		
8.	Managing gallery content	admin	1. Press the gallery menu 2. Press the add gallery button 3. fill in the required data in the image gallery 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	Successfully add gallery images, edit gallery images, and delete gallery images and display on gallery page	Yes	
9.	Managing congregation data	admin	1. Press the congregation data menu 2. Press the button to add congregation data 3. fill in the required data in the congregation data 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	Successfully added, edited, and deleted congregation data. Filtered by birth date to identify congregation members whose birthdays occurred within the week.	yes	
10.	Managing financial news	admin	1. Press the financial news menu 2. Press the add news data button 3. fill in the required data in the financial statements 4. press the send button 5. Press the edit button if you want to change the data 6. press the delete button to delete data	Successfully added financial news, edited financial news, and deleted financial news.	yes	

3.5 Deployment

The application was successfully created using website technology using the PHP programming language and the Laravel framework. The results are as follows:

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Figure 16home screen view

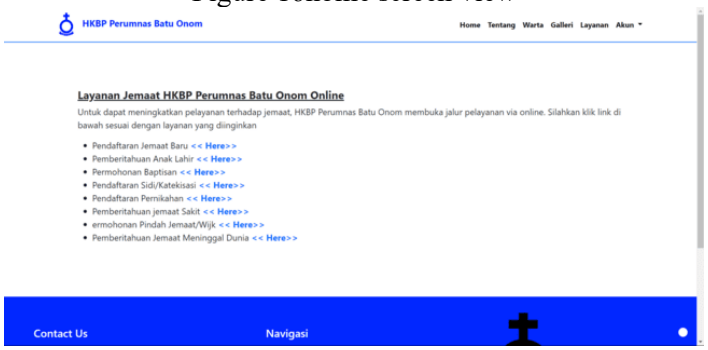

Figure 17service page

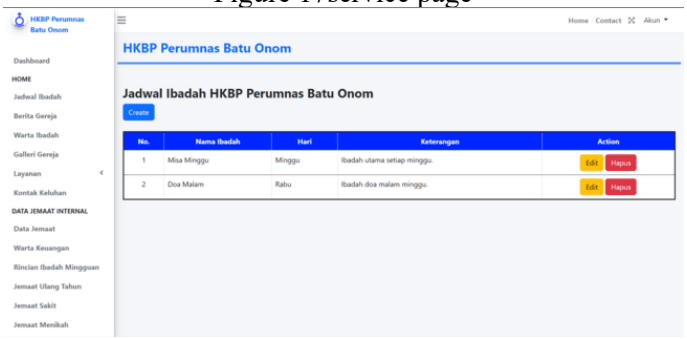

Figure 18admin page - add schedule

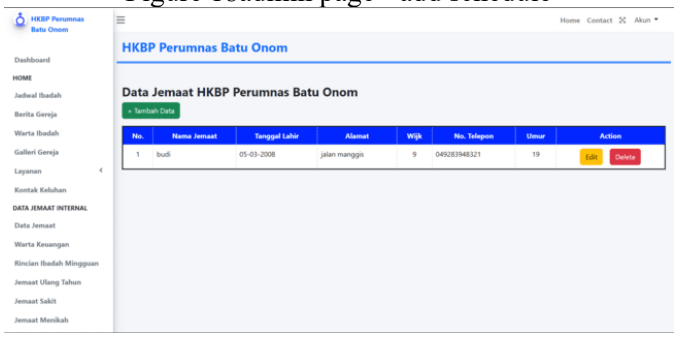

Figure 19admin page - add congregation data

3.6 Review

In the review stage, the Expert Statement method was used, which was quoted directly from the church secretary as a member of the church management, IT professionals as part of the church management, the congregation in the HKBP Perumnas Batu Onom church area, and the congregation outside the area. According to the church secretary's experience using the website, they indicated that the church information system they built was filled with important information needed to disseminate church information. There is a service schedule to make it easier for the congregation to see the service schedule and upcoming activities, there is a service bulletin section that can be downloaded by the congregation, and there is a service menu so that the congregation no longer needs to bother asking for forms from the local neighborhood elders. Sintua Sahat S Sitanggang, M.Kom., an IT professional who is part of the church management, stated that the information

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system website they built already includes all the necessary components and is very efficient, so that the congregation does not need to have much experience to use the church website. Congregants who attend in-person church services say that using the church information system website has been very helpful in disseminating worship messages. Because the church had just held a joint service last week and invited neighboring churches to join, but not all members attended, the church service paper immediately ran out. Church officials were at a loss as to how to resolve the issue. Enryco Sidabutar, a member of the congregation outside the area, stated that the church information system allows out-of-town congregations to easily obtain information about ongoing church activities. He also stated that having a church service schedule helps congregations outside the area who want to attend in-person church services. Based on the four statements above, it can be concluded that the HKBP Perumnas Batu Onom church information system website is very helpful in disseminating information and facilitating the church secretary in processing congregation data. It also helps the congregation find information related to church worship activities. All the features provided on the church website are considered to address the problem of using printed media for information dissemination and can help reduce church expenses.

CONCLUSION

This study found that the church information system, which operates through the HKBP Perumnas Batu Onom website, will make it easier for congregations and church administrators to find information about the church and to manage congregational and financial data. By using agile methods in web development, the website can be tailored to the needs of the congregation and has an easy-to-use interface because it focuses on the target user. This web-based system allows services to be conducted online without having to go to the church or neighborhood synagogue. This shows that this web-based church information system at HKBP Perumnas Batu Onom can improve time efficiency, effectiveness, and security due to the benefits of using agile methods in system development.

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